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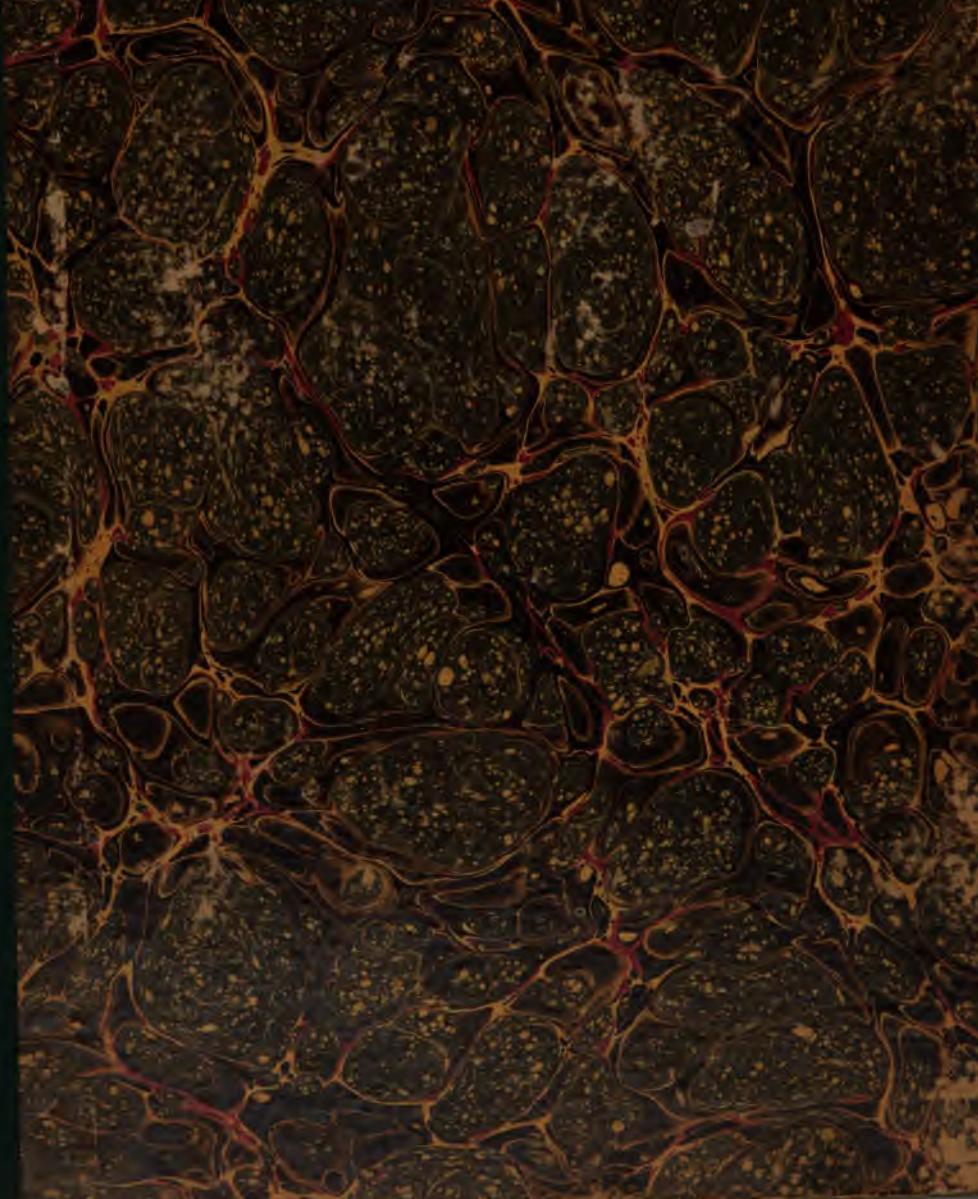
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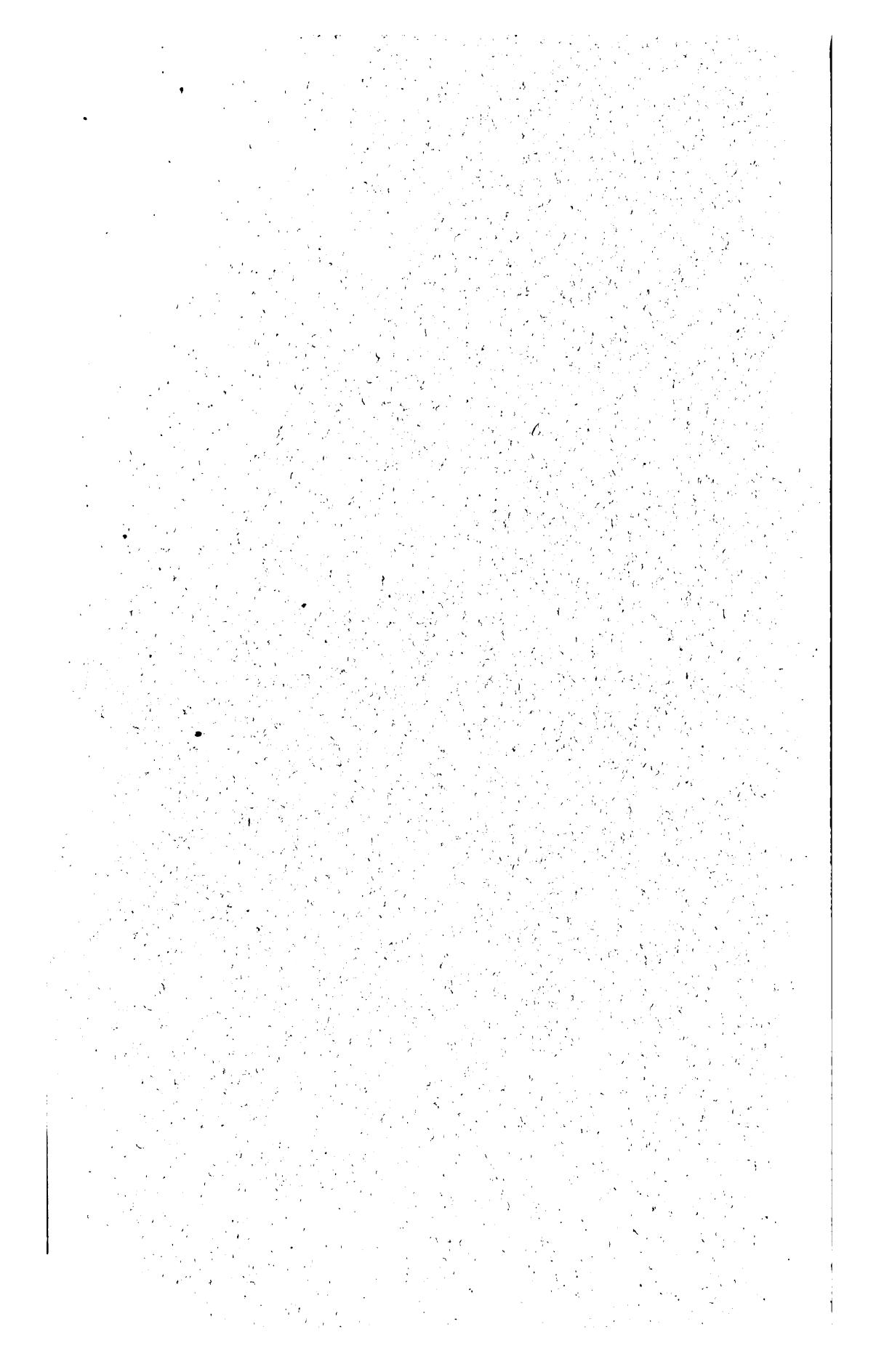
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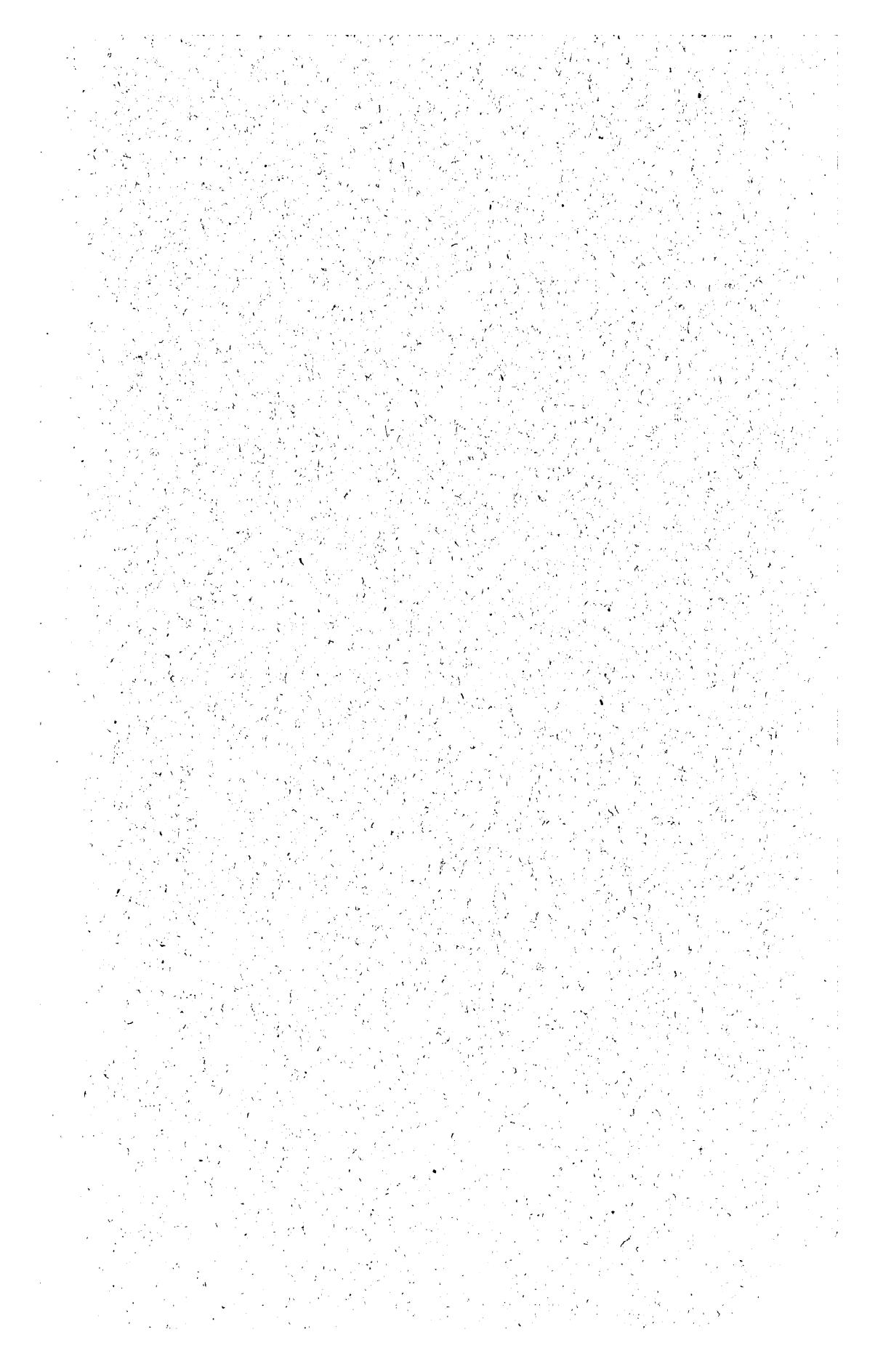
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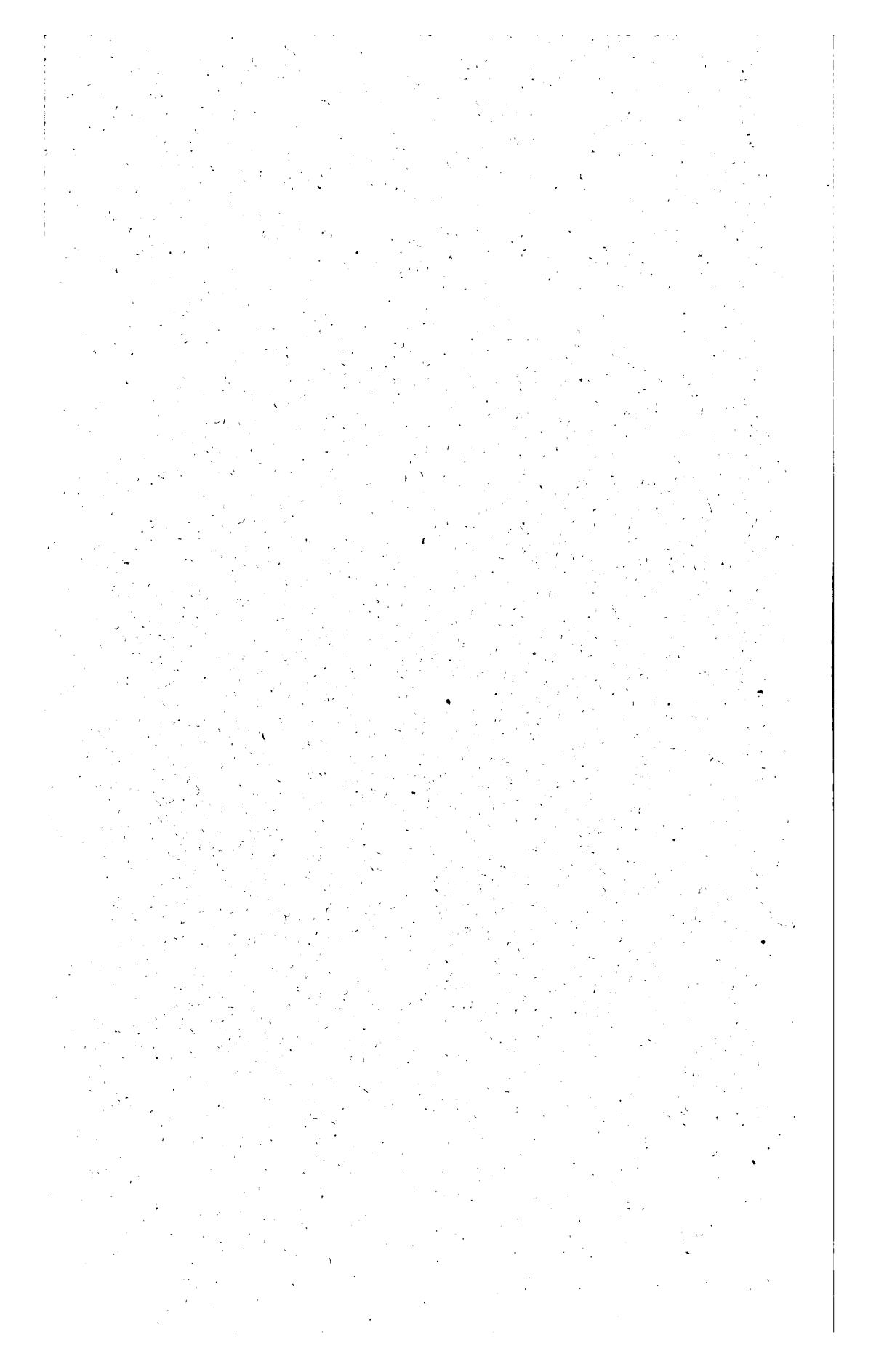
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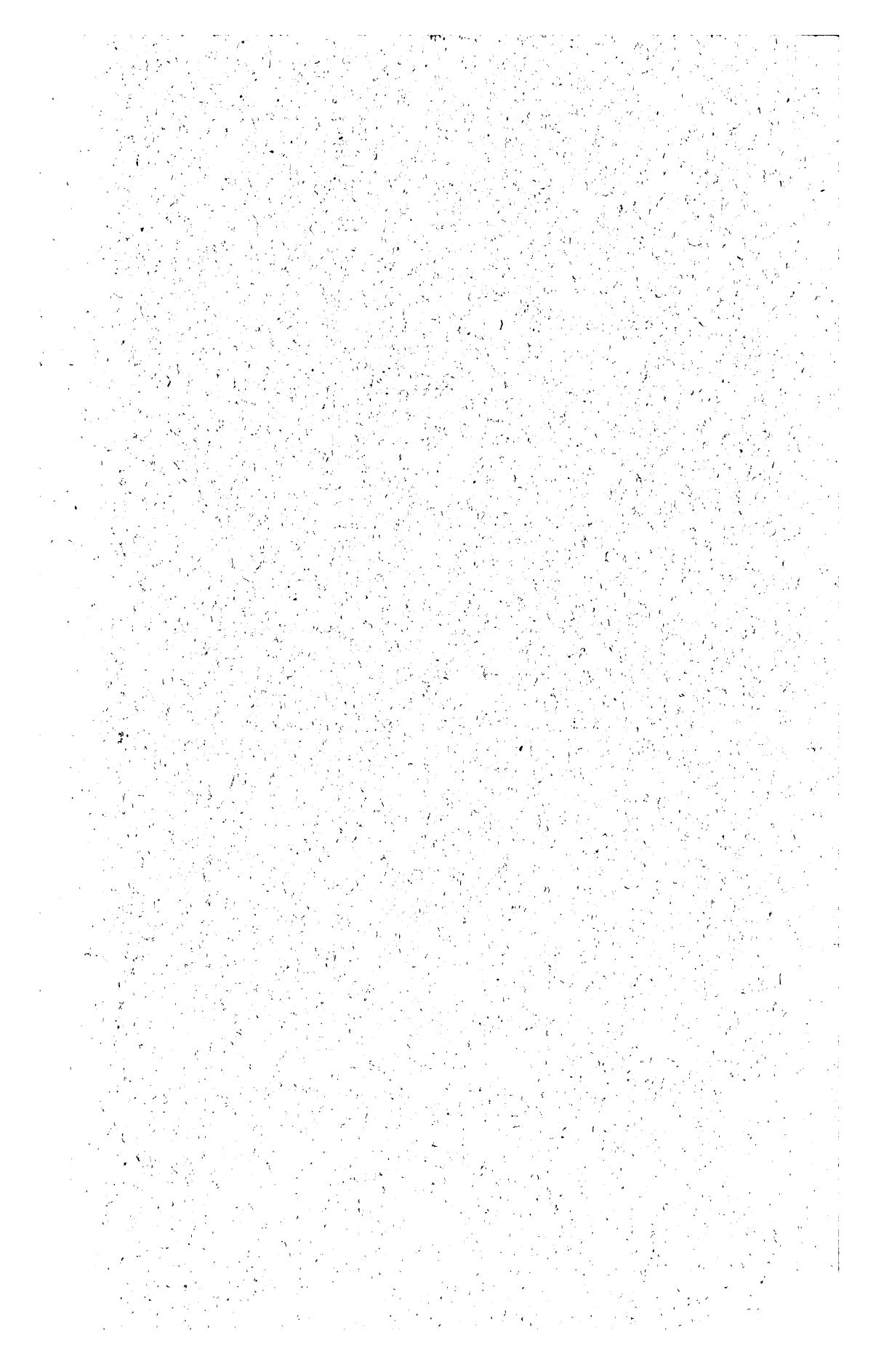
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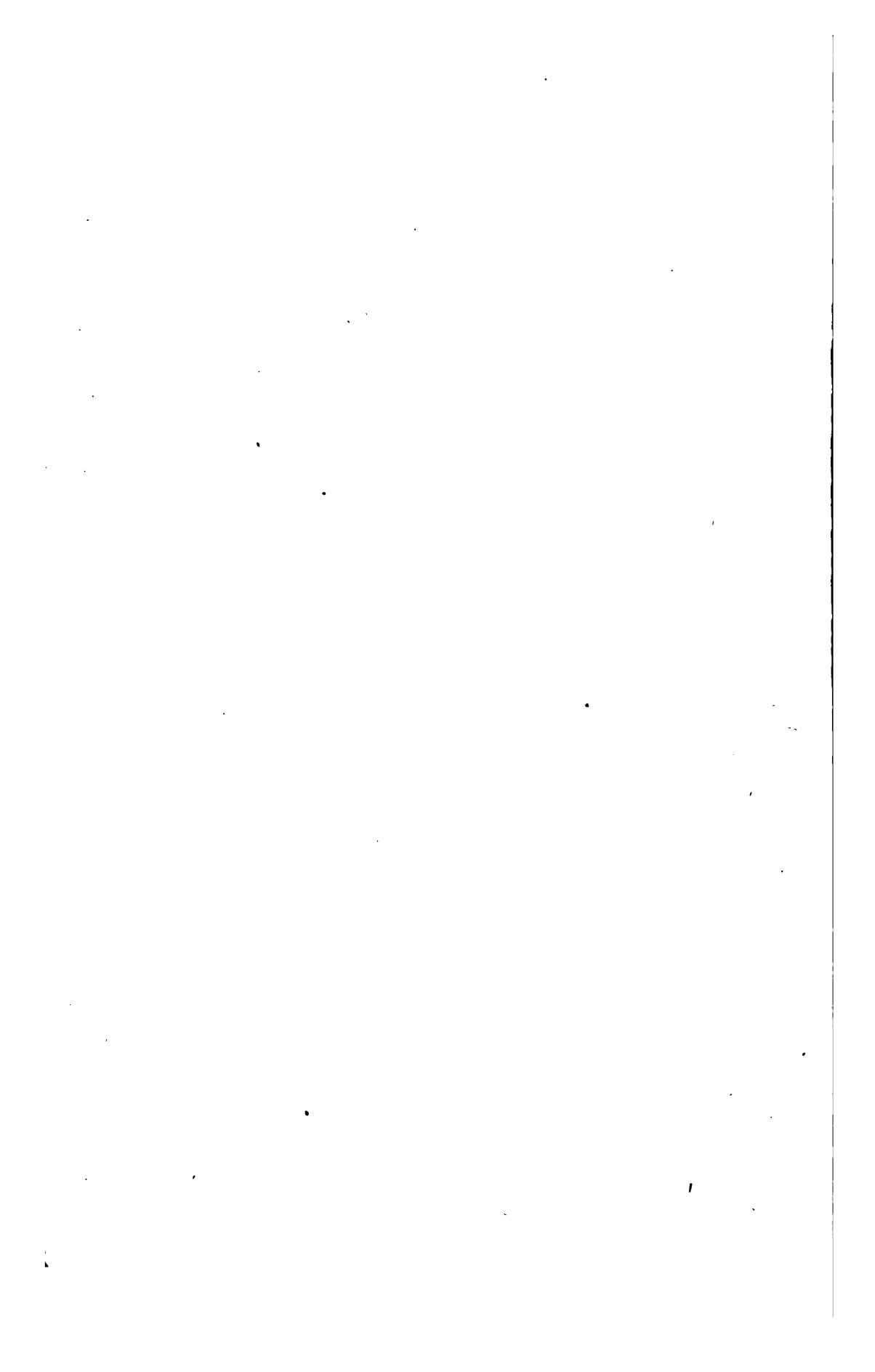
BY

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AND IN THE MONTANA SCHOOL OF MINES.



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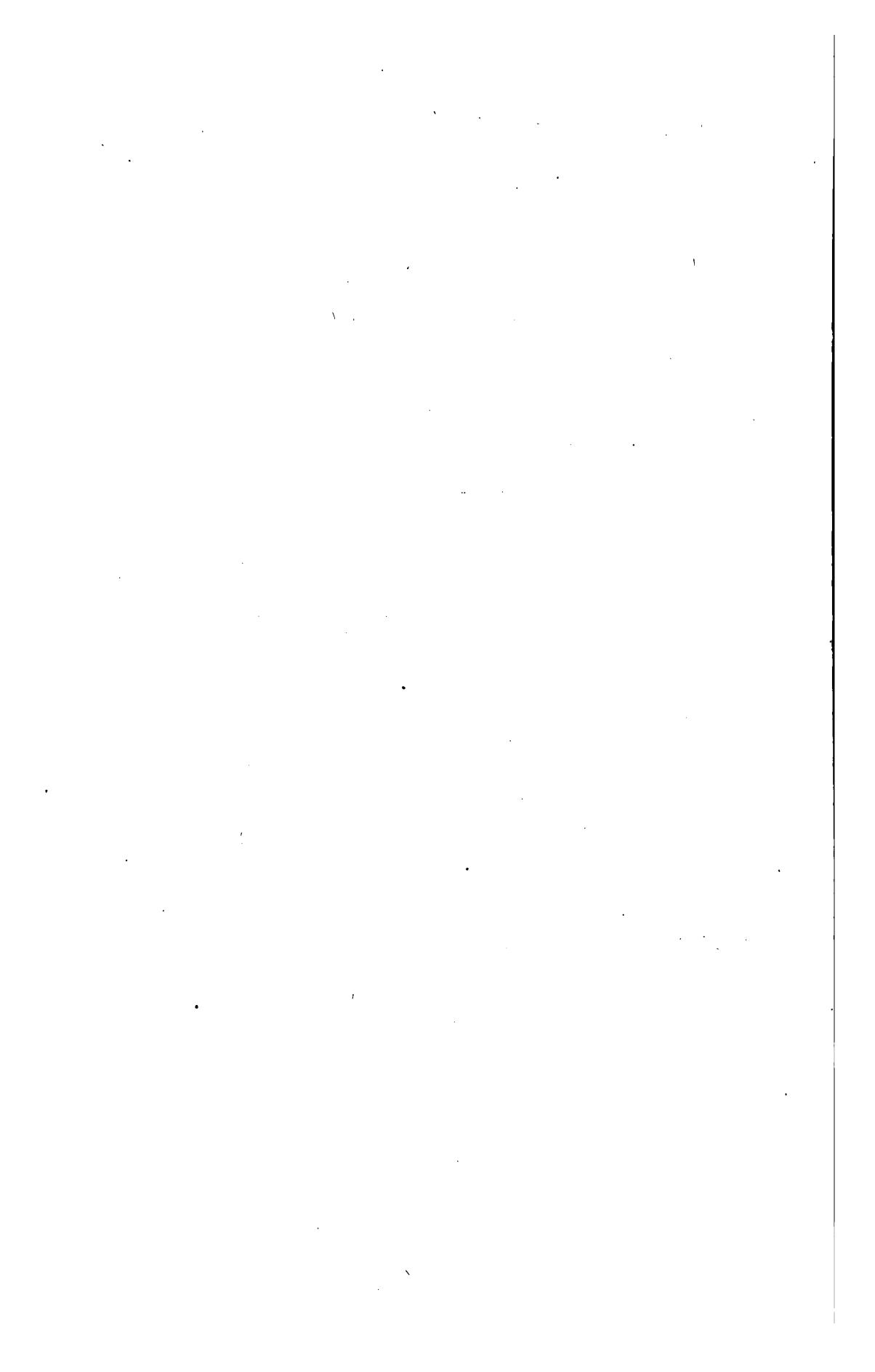


## P R E F A C E .

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The following "Index to the Literature of Columbium" has been published upon the recommendation of the Committee on Indexing Chemical Literature, of the American Association for the Advancement of Science. In its original draft the word "niobium" was used in place of "columbium;" but upon suggestion from members of the Committee the author consented to a change. It is well known that the name columbium, originally given by Hatchett, has clear priority; while "niobium," and its supposed twin "pelopium," grew out of errors made by Rose. Although in European treatises the name "niobium" has generally been adopted, no good reason for the substitution has ever been offered, and all the accepted rules of nomenclature demand the retention of columbium. This note has been written at the request of Professor Traphagen.

F. W. CLARKE.



# INDEX TO THE LITERATURE OF COLUMBIUM, 1801-1887.

BY FRANK W. TRAPHAGEN.

DATE.	AUTHOR.	REMARKS.	REFERENCES.
1801	HATCHETT -----	Discovery of element -----	Phil. Trans. Roy. Soc., 1802, XCII, 49. Chem. J., Crelle, 1802, I, 197, 257, 352. Ann. der Phys., Gren, x, 500; XI, 120. Nicholson's J., Jan., 1802, 32.
1809	WOLLASTON -----	Identity of columbium and tantalum.	Phil. Trans. Roy. Soc., 1809, XCIX, 246. J. für Chem., Schweigger, I, 520. Ann. der Phys., Gren, XLII, 50.
1811	WOLLASTON -----	Element -----	Ann. der Phys., Gren, XXXVII, 98.
1817	LEONHARD and VOGEL.	Identity of columbium and tantalum.	Königl. Acad. der Wiss., 1817.
1839	WÖHLER -----	Properties of oxide -----	Ann. der Phys., Pogg., XLVIII, 91.
1840	H. ROSE -----	Researches -----	J. für Chem., Schweigger, XXI, 60.
1844	H. ROSE -----	Researches -----	Ber. d. Chem. Ges., 1844. J. prakt. Chem., XXXIV, 86.
1846	H. ROSE -----	Researches on compounds and minerals.	Ann. der Phys., Pogg., LXIX, 115. Berzelius' Jsb., 1846, XXV, 158.
1846	HERMANN -----	Oxides -----	J. prakt. Chem., XXXVIII, 91.
1847	H. ROSE -----	Acids in columbite -----	Ann. der Phys., Pogg., 1847, 4.
1848	H. ROSE -----	Effect of temperature on specific weight.	J. prakt. Chem., XLI, 219.
1848	SCHEERER -----	Niobic and pelopic acids in Wöhlerite.	J. prakt. Chem., XLIII, 254.
1848	HERMANN -----	Ilmenic, niobic, and pelopic acids.	Ann. der Phys., Pogg., LXXII, 565. Jsb. Chem., 1848, 1208. Mineralog. Forsch., Kenn., 1849, 197. J. prakt. Chem., XXXI, 94; XL, 475. Berzelius' Jsb., XXV, 875. Ann. Chem., Liebig, LXI, 264. Jsb. Chem., 1848, 1205.

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1848	SCHEERER -----	Niobic and pelopic acids in euxenite and polycrase.	Jsb. Chem., 1848, 1206. Ann. der Phys., Pogg., L, 149; LXXII, 256, 568. Berzelius' Jsb., XXI, 179; XXVI, 374.
1848	H. ROSE -----	Niobic, ilmenic, and pelopic acids.	Jsb. Chem., 1848, 1206. Jsb. Chem., 1848, 1208.
1848	HERMANN -----	Ilmenium -----	J. prakt. Chem., XXXVIII, 91, 119.
1848	PERETZ -----	Niobic, ilmenic, and pelopic acids.	Ann. der Phys., Pogg., LXXI, 157. Ber. d. Chem. Ges., 1847, 141. Rammels. Handw., 3d supp., 105, 129. Jsb. Chem., 1848, 1209.
1848	HERMANN -----	Ilmenic acid in pyro-chlore and columbite.	J. prakt. Chem., XL, 475; XLII, 129; XLIV, 216.
1848	H. ROSE -----	Identity of ilmenium and niobium.	Jsb. Chem., 1848, 1210. Ann. der Phys., Pogg., LXXI, 157; LXXXIII, 449. Pharm. Centrbl., 1848, 169.
1848	H. ROSE -----	Properties metal and oxides.	Jsb. Chem., 1848, 404. Ann. der Phys., Pogg., LXXXIII, 818. Ann. Chem., Liebig, LXVIII, 165. Pharm. Centrbl., 1848, 145.
1848	H. ROSE -----	Pelopium -----	Jsb. Chem., 1848, 405. Ann. der Phys., Pogg., LXXIV, 85. Ann. Chem., Liebig, LXXVIII, 165. Pharm. Centrbl., 1848, 439.
1850	HERMANN -----	Niobates -----	J. prakt. Chem., XLIV, 220. Arch. ph. nat., VIII, 205. Jsb. Chem., 1848, 405. J. prakt. Chem., L, 164-172, 185-197.
1851	EBELMAN -----	Crystals of niobic acid.	Jsb. Chem., 1850, 748. C. R., XXXIII, 330, 718. Instit., 1851, 73, 180. Pharm. Centrbl., 1851, 293. Ann. chim. phys., XXXIII, 34. J. prakt. Chem., LIV, 148. Ann. Chem., Liebig, LXXX, 205. Jsb. Chem., 1851, 14.
1853	H. ROSE -----	Researches, identification, and compounds chlorides, etc.	Ann. der Phys., Pogg., XC, 456. Ber., 1853, 604. Ann. Chem., Liebig, LXXXVIII, 245. J. prakt. Chem., LX, 468. Pharm. Centrbl., 1854, 11. Instit., 1854, 16. Jsb. Chem., 1853, 858.
1854	CONNELL -----	Name -----	Phil. Mag. [4], VII, 461. Am. J. Sci. [2], XVIII, 892.

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1854	CONNELL -----	Name -----	Jsb. Chem., 1854, 388.
1855	HERMANN -----	Researches on ilmenium, niobium, and tantalum.	J. prakt. Chem., LXV, 54.
1856	HERMANN -----	Niobium, ilmenium. Researches.	J. prakt. Chem., LXVIII, 65. Chem. Centrbl., 1856, 738. Chem. Gaz., 1857, 10.
1856	OESTEN -----	Researches -----	Ann. der Phys., Pogg., XCIX, 619; c, 340. J. prakt. Chem., LXX, 120. Jsb. Chem., 1856, 661.
1858	HERMANN -----	Separation of niobic and tantalic acids. Remarks on pelopic acid.	Ann. der Phys., Pogg., CIII, 148. J. prakt. Chem., LXXIII, 877, 508. Chem. Centrbl., 1858, 165. Jsb. Chem., 1858, 149.
1858	OESTEN -----	Researches -----	J. prakt. Chem., LXXI, 897; LXXV, 62. Ann. der Phys., Pogg., CIII, 148. Ber., 1858, 888.
1858	H. Rose -----	Niobic and niobous acids, metallic niobium, chloride, etc.	J. prakt. Chem., LXXIV, 458, 461. Ann. der Phys., Pogg., crv, 810. Chem. Centrbl., 1858, 598. Ann. Chem., Liebig, CVIII, 230. Instit., 1858, 854. Ann. chim. phys. [8], LIV, 426. Cimento, VIII, 275. Jsb. Chem., 1858, 151. Ber., 1858, 408.
1858	H. Rose -----	Compounds -----	J. prakt. Chem., LXXIV, 461. Chem. Centrbl., 1858, 881. Ann. Chem., Liebig, CVIII, 232. Instit., 1858, 870. Ann. der Phys., Pogg., crv, 482. Jsb. Chem., 1858, 158. Ber., 1858, 445.
1858	H. Rose -----	Niobium sulphide -----	J. prakt. Chem., LXXV, 69. Chem. Centrbl., 1858, 768. Ann. Chem., Liebig, CVIII, 285. Instit., 1859, 5.
1858	H. Rose -----	Niobiumfluoride -----	Ann. der Phys., Pogg., crv, 424. Ber., 1858, 448. J. prakt. Chem., LXXV, 71. Chem. Centrbl., 1858, 764. Ann. Chem., Liebig, CVIII, 284. Instit., 1859, 6.
1859	H. Rose -----	Chlorides and fluorides.	Ann. der Phys., Pogg., crv, 581. Ber., 1859, 549.
1859	H. Rose -----	Nitrate -----	J. prakt. Chem., LXXVIII, 188. Chem. Centrbl., 1859, 849; 1860, 181. Ann. chim. phys. [8], LVIII, 104. Ann. der Phys., Pogg., CVIII, 278, 465. Jsb. Chem., 1859, 158. Ber., 1859, 12. J. prakt. Chem., LXXVI, 245.

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1859	H. ROSE	Niobic acid, chloride, sulphide, nitrate.	J. prakt. Chem., lxxviii, 98. Chem. Centrbl., 1859, 678. Ann. der Phys., Pogg., cvii, 409. Jsb. Chem., 1859, 158. Ber., 1859, 527.
1859	H. ROSE	Salts	J. prakt. Chem., lxxviii, 102. Chem. Centrbl., 1859, 749. Ann. der Phys., Pogg., 566. Bull. d. k. bayr. Acad. d. Wissen- schaft., II Classe, Sitzung V, 10, Mar., 1860.
1860	VON KOBELL	Dianium and dianic acid.	Ann. Chem., Liebig, cxiv, 337. J. prakt. Chem., lxxxix, 291. Vierteljahrsschr. pr. Pharm., ix, 874. Chem. Centrbl., 1860, 695. Ann. chim. phys. [3], lxi, 477. Rep. chim. pure., ii, 360. Am. J. Sci. [2], xxx, 128. Jsb. Chem., 1860, 150, 781. Ber. 1860, 281.
1860	H. ROSE	Compounds	J. prakt. Chem., lxxxii, 221. Chem. Centrbl., 1860, 737. Ann. der Phys., Pogg., cxii, 193. Jsb. Chem., 1860, 145. Ber., 1860, 296.
1860	H. ROSE	Niobous acid	J. prakt. Chem., lxxxii, 212. Chem. Centrbl., 1860, 738. Rep. chim. pure., iii, 117. Jsb. Chem., 1860, 148.
1860	H. ROSE	Niobates	Ber., 1860, 710. J. prakt. Chem., lxxxii, 365. Chem. Centrbl., 1861, 94. Rep. chim. pure., iii, 117. Jsb. Chem., 1860, 148.
1860	H. ROSE	Nitrate	Ann. der Phys., Pogg., cxii, 426. Jsb. Chem., 1860, 149.
1861	NORDENSKIOLD	Niobic acid	Jsb. Chem., 1861, 209. Ann. der Phys., Pogg., cxiv, 612.
1861	HERMANN	Dianium	J. prakt. Chem., lxxxiii, 106, 317. Rep. chim. pure., iv, 50. Jsb. Chem., 1861, 209.
1861	VON KOBELL	Dianium	J. prakt. Chem., lxxxiii, 110, 371, 449. Rep. chim. pure., iv, 51. Ann. Chem., Liebig, cxix, 283. Jsb. Chem., 1861, 209. Am. J. Sci. [2], xxxvii, 355. Chem. News, x, 37, 49.
1864	GIBBS	Action of H F on co- lumbite.	

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1864	BLOMSTRAND -----	Chlorides and acids.	Ofversigt af. Acad. Forh., 1864, XXI, 541. J. prakt. Chem., XCVII, 87. Ann. Chem., Liebig, CXXXV, 198. Zeitschr. Chem., 1865, 543. N. Arch. ph. nat., XXIII, 326. C. R., LIX, 852; LXI, 337. Instit., 1864, 282. C. R., LXI, 1064. Instit., 1865, 395. Zeitschr. Chem., 1865, 747. Chem. Centrbl., 1866, 174. Phil. Mag. [4], XXXI, 142. Jsb. Chem., 1865, 197.
1865	CARON -----	Niobic acid in tin ore.	N. Arch. ph. nat., XXIII, 167; XXV, 5. Ann. chim. phys. [4], VIII, 5, 49. Zeitschr. Chem., 1865, 654; 1866, 109. C. R., LX, 234, 1855. Instit., 1865, 220. Bull. soc. chim. [2], III, 871; V, 119. Ann. Chem., Liebig, CXXXV, 49; CXXXVI, 295. J. prakt. Chem., XCIV, 304. Phil. Mag. [4], XXX, 445. Am. J. Sci. [2], XLI, 111. Jsb. Chem., 1865, 209. J. prakt. Chem., XCIV, 483; XCVI, 249. Ann. Chem., Liebig, CXXXVI, 299. Jsb. Chem., 1865, 208.
1865	VON KOBELL -----	Dianic acid.	J. prakt. Chem., XCIV, 65. Zeitschr. Chem., 1865, 659. Zeitschr. Anal. Chem., IV, 268. Jsb. Chem., 1865, 209. C. R., LVI, 891; LX, 1221. Instit., 1865, 185. Bull. soc. chim. [2], V, 119. N. Arch. ph. nat., XXIII, 222. Ann. Chem., Liebig, CXVII, 274; CXXXVI, 249. Zeitschr. Chem., 1865, 462. Jsb. Chem., 1865, 210.
1865	HERMANN -----	Acids, formula, atomic weight, ilmenium.	N. Arch. ph. nat., XXVII, 167. Zeitschr. Chem., 1866, 717. J. prakt. Chem., C, 117. Jsb. Chem., 1866, 205.
1865	DEVILLE and TROOST.	Vapor density of chloride.	
1866	DELAFONTAINE -----	Oxides.	

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1866--	HERMANN -----	Ilmenium -----	J. prakt. Chem., xcix, 80, 279, 287, 290. Jsb. Chem., 1866, 205. Zeitschr. Chem., 1867, 124. Ann. Chim., Liebig, cxxxviii, 257.
1866--	BUNSEN -----	Flame reactions -----	Zeitschr. Anal. Chem., v, 351. Phil. Mag. [4], xxxii, 81. N. Arch. ph. nat., xxvii, 25. N. Arch. ph. nat., xxix, 265. Ann. chim. phys. [4], xiii, 5. J. prakt. Chem., ci, 459; cii, 448. Zeitschr. Chem., 1867, 721; 1868, 91.
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1867--	HERMANN -----	Constitution of com- pounds.	C. R., lxvi, 180. Instit., 1868, 42. N. Arch. ph. nat., xxxi, 89. Bull. soc. chim. [2], ix, 465. Am. J. Sci. [2], xlvi, 398. J. prakt. Chem., civ, 426. Zeitschr. Chem., 1868, 117. Jsb. Chem., 1868, 212.
1868--	MARIGNAC -----	Niobium, ilmenium hydrate.	Zeitschr. Chem., 1868, 178.
1868--	DEVILLE-----	Niobium -----	J. prakt. Chem., ciii, 128, 420; cv, 221.
1868--	HERMANN -----	Acids -----	Zeitschr. Chem., 1869, 811. Jsb. Chem., 1868, 216.
1869--	RAMMELLSBERG ---	Compounds, atomic weight.	Ann. der Phys., Pogg., cxxxvi, 177-197, 352-372. J. prakt. Chem., cvii, 334; cviii, 77. Jsb. Chem., 1869, 288.
1869--	HERMANN -----	Constitution of miner- als.	J. prakt. Chem., cvii, 189. Bull. de la soc. imp. des Natu- ralistes de Moscow, 1869, 141. Chem. News, xx, 119. Jahrb. Min., 1870, 629. Jsb. Chem., 1869, 1280.
1870--	HERMANN -----	Separation of niobium from ilmenium.	J. prakt. Chem. [2], ii, 108. Zeitschr. Anal. Chem., x, 344. Jsb. Chem., 1870, 989.
1871--	HERMANN -----	Researches -----	J. prakt. Chem. [2], iii, 373, 427; iv, 178-211. Bull. Soc. Chim. [2], xvi, 256. Jsb. Chem., 1871, 287.

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DATE.	AUTHOR.	REMARKS.	REFERENCES.
1871	RAMMELLSBERG	Composition natural niobates and separation of metallic acids.	Ber., 1871, 157, 198, 406, 584, 874. Instit., 1872, 58, 802. Ann. der Phys., Pogg., CXLIV, 56, 191. J. Chem. Soc., XXV, 189. Chem. Centrbl., 1871, 511. Jsb. Chem., 1871, 1163. Ber., 1872, 17.
1872	RAMMELLSBERG	Constitution of minerals.	Min. Mittheil., 1878, 224.
1873	STELZNER	Occurrence of minerals in granite.	Jahrb. Min., 1874, 805.
1875	JOLY	Salts, niobates of Mg Ca, Fe, Yt, Mn.	C. R., LXXXI, 268. J. Chem. Soc. (abs.), XXIX, 46.
1875	JOLY	Oxyfluorides	Jsb. Chem., 1875, 222. C. R., LXXXI, 1266. J. Chem. Soc., XXIX, 888.
1875	BONG	Ferrocyanide	Bull. Soc. Chim. [2], XXIV, 268.
1875	SANTESSON	Hydrate, fluoniobates, niobates (K and Na), fluoniobates of Zn, Cd, Mn, Co, Ni, Cu, Fe, Hg.	J. Chem. Soc., XXIX, 45. Ber., 1876, 854. Jsb. Chem., 1876, 280.
1876	JOLY	Acids, nitrides, and carbides.	C. R., LXXXII, 1195. Bull. Soc. Chim. [2], XV, 506. Jsb. Chem., 1876, 279.
1877	J. L. SMITH	Researches	Abs. J. Chem. Soc., XXX, 277. Am. J. Sci. [3], XIII, 359; XIV, 128.
1877	J. L. SMITH	Name	Ann. chim. phys. [5], XII, 255. Zeitschr. Kryst., I, 499.
1877	HERMANN	Researches, neptunium	C. R., LXXXIV, 1086.
1878	J. L. SMITH	Researches, mosandrium.	Abs. J. Chem. Soc., XXXIX.
1878	ROSCOE	Metal and chlorides	Ann. Ch. phys. [5], XII, 258. Jsb. Chem., 1877, 288.
1882	WELLER	Action of hydrogen peroxide on oxides.	J. prakt. Chem., [2], XV, 105.
1883	SMITH	Method for analysis	C. R., LXXXVII, 146.
1883	BOISBAUDRAN	Separation from gallium.	Abs. J. Chem. Soc., XXXVI, 12. Chem. News, XXXVII, 25.
1883	DONATH and MAY-ERHOFER.	Atomic volume and affinity.	Abs. J. Chem. Soc., XXXVI, 1272. Jsb. Chem., 1878, 300.
1883	SEAMON	Analysis of a niobate	Ber., 1882, 2592. Jsb. Chem., 1882, 1292.
1884	HAUSHOFER	Microscopic analysis	Amer. Chem. J., V, 44, 78. Chem. News, XLVIII, 18, 29.
1885	OSBORNE	Quantitative determination.	C. R., XCVI, 152; XCVII, 780. Chem. News, XLVII, 100. Jsb. Chem., 1883, 1574. Ber., 1888, 1688. Jsb. Chem., 1888, 26. Chem. News, XLVI, 205. Abs. J. Chem. Soc., XLIV, 32. Ber., 1884, 182. Sitzungsber. bair Akad., XI, 436-448. Jsb. Chem., 1884, 1551. Am. J. Sci. [3], XXX, 829-337.

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1887	DEMARGAY.....	Action of carbon tetrachloride upon niobic anhydride.	Ab. J. Chem. Soc., 1887, 304. C. R., cv, 111. Ab. J. Chem. Soc., 1887, 329.
1887	KNOP.....	Crystallization niobic anhydride.	Zeitschr. Kryst. Min., XII, 610.

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1805	VALENTINE.....	Columbite .....	Nicholson's J., Jan., 1802, 82. Magazine Encyclop., Dec., 1805, 388.
1811	GILBERT.....	Columbite .....	Ann. der Phys., Gren., xxxiv, 120.
1827	LEVY.....	Aeschynite .....	Phil. Mag., I, 27.
1828	HARTWALL .....	Fergusonite and aeschynite.	K. Vet. Acad. Handl., 1828, 167. Berzelius' Jsb., 1830, IX, 195.
1831	LEVY.....	Aeschynite .....	Ann. der Phys., Pogg., xvii, 483.
1831	BROOKE .....	Aeschynite .....	Phil. Mag., x, 187.
1836	THOMSON .....	Columbite .....	Ann. der Phys., Pogg., xxiii, 861.
1844	HERMANN .....	Aeschynite .....	Records of General Science, IV, 407.
1846	H. ROSE .....	Researches on minerals.	J. prakt. Chem., XIII, 221.
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1848	SCHEERER .....	Wöhlerite.....	Ann. der Phys., Pogg., LXIX, 115.
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